The Hellgate Static
February 2024

Hellgate Amateur Radio Club
P.O. Box 3811, Missoula, MT 59806-3811
Web: www.w7px.org

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Officers:

President: NZ7S
Vice-President: W7RPG
Treasurer: KJ7YHG
Secretary: K7MSO

Positions:

Emergency Coordinator: trustee@w7px.org
QSLs, Awards: trustee@w7px.org
Webmaster: trustee@w7px.org
Asst Webmaster: editor@w7px.org
License Exams Contact VE:
harc.ve.testing@gmail.com
Static Editor: editor@w7px.org

Repeater Committee:

W7RPG (Chair)
K7QA --- Dec 2022 for (23/24)
KG7WYO – Dec 2022 for (23/24)
N7PAS -- Dec 2023 for (24/25)
KI7PCR -- Dec 2023 for (24/25)

C&BL – Board + N7PAS and K7MTD

Buy-Sell Operations hfc@w7px.org
W7XT, K0SN, K7QA

Coming Events 2024

Feb 02 Groundhog Day
Feb 12 Testing, Meeting
Feb 14 Valantine's Day
Feb 19 Presidents's Day
Mar 10 Dalight Savings Start 2:00AM
Mar 11 Testing, Meeting
Mar 17 St. Patrick's Day

HARC January Meeting

Program: None

Membership Dues are now Overdue

This is a reminder that all memberships except life end on Dec 31st. Please remember to pay your dues for the year 2024. Thank You.

RADIO LICENSE AND EXAMS

We are having in-person monthly meetings and live in person online testing. The testing and meeting are on the 2nd Monday of each Month.
The Radio license Exams are from 5:30-6:30PM
Meetings which start at 7:00PM will be held at The Church of Jesus Christ of Latter Day Saints, 3026 South Avenue West, across the street from Big Sky High School. Use the North entrance as all others will be locked.
Meeting will begin at 7:00PM (Program & Business).

Published: 31 Jan 2023 @9:45 PM by N7PAS

8 Jan 2024 Exam Testing Results

Congratulations to:

* 1. Jeff Abbott of Missoula passed his Technician exam. His new call sign is KK7QJH.
* 2. David Bixby of Missoula passed his Technician exam. His current call sign is KK7QJP.
* 3. Victor Cavanaugh of Missoula passed his General exam. His current call sign is K4MGQ.

8 Jan 2024 HARC Meeting Minutes Meeting called to order @ 7:00 PM

1. **Attendance:** N7PAS , W7RPG , AG7FH , NZ7S, K7MTD, KK7NOM, K7MSO, KF7GRZ, N7DLP, KJ7YHG, K7QA, K0SN, W7XT, KK7KEK, KK7MPW, KR7Q
   Visitors: KM6IIN,
   NOTE: 16 Members present. Thank you to all that attended.
2. **Last meeting minutes, Dec:** Motion to approve minutes: 1St W7RPG 2nd K7QA
   Discussion _Corrected a callsign mistake in minutes_____ Vote: Passed
3. **Treasurer's report KJ7HYG/W7XT:** Discussion_None_____
   _____ Vote: Tabled
4. **Repeater Committee W7RPG:** Discussion _Nove _____ Vote: Tabled
5. **HF Committee Report K0SN: _____**
   _____ Vote: _____
6. **Discussion List:**
   a. Need easy email address on website. The ones already on the site are confusing.
   b. Discussion on what radio projects people are doing on their own time
   c. Discussion on Events list. President wants to do more this year.
7. **New Business:**
   a. None
8. **Net Control Operators**

Feb	07	N7PAS	Mar	06	N7PAS
Feb	14	K7MSO	Mar	13	_____
Feb	21	K7MSO	Mar	20	_____
Feb	28	W7RPG	Mar	27	N7JGS
___	__	_____	___	__	_____

9. **Good & Welfare:**

Meeting adjourned at 8:03 PM. Minutes by K7MSO

Program: None

REMINDER:

Dues for 2024 were due in Nov and Dec. All unpaid membership except life ended @ midnight 31 Dec 2023.
The current amount is $25.00 per person and $5.00 for each additional family member.
1 year free members, your payment will be due the month you earned your license and
will be prorated to the end of the following year.
Dues may be sent to Hellgate Amateur Radio Club, P.O. Box 3811, Missoula, MT 59806-3811
Please send your payment in now to keep from being dropped from the Club roster and newsletter.

HARC INVENTORY -- FOR SALE

Line	ITEM	MAKE	MODEL	CONDITION	VALUE	STORED	REMARKS
1	Computer	Dell	Latitude	Fair	100	N7GE	
2	Pow Supply 220-225mhz	Mirage	C106G	Good	25	N7GE	
3	Radio-Hand Held 2 met.	Realistic	HTX 202	Good	50	N7GE	
4	Radio--2 meter	Yaesu	FT-2500M	Fair	$100	N7GE	
5	Portable Repeater		TM-241X2	?		N7GE	
6	Triband Beam	Hy-Gain		Few Missing parts	200	K0SN	
7	Tuner	Signal Corps	BC939B	Parts only	25	K0SN	parts only, no cabinet
8	Speaker + Power Supply	Drake	MS-4 + AC4	Not tested	75	K7QA	needs upgrade
9	Reflected Pwr Mtr	Heathkit	HM-15	Works		K7QA	
10	Mobile Tuning Mtr	Heathkit	PM-2	Untested		K7QA	
11	Trap Vertical	Hygain	14AVQ	Clean, untested	150	K7QA	
12	Transceiver-2 mtr	Kenwood	TR-7400A	Works	70	K7QA	
13	2 Mtr HH Transceiver	Realistic	HTX-202	Error Code	25	K7QA	
14	Speaker w/volume control	Yaesu		Untested	50	K7QA	
15	1993 ARRL Handbook			like new	free	K7QA	
16	Handbooks	ARRL	1950-1980	OK	Free	KGVO	
17	Vintage Mic	Astatic	JT-30	worn, untested	50	KGVO	Ebay sales $50-300
18	13.8V, 12A power supply	Astron	RS12A	works	30	KGVO	
19	C&R checker	CDE		untested	30	KGVO	
21	Rotor	CDE?		untested	50	KGVO	w/ control head
22	Transceiver	Collins	RT-91ARC-2	untested	100	KGVO	Aircraft Military
23	Transverter Interface	Down E. Micro		untested	offer	KGVO	
24	Low pass Filter	Drake	TV-3300	untested	20	KGVO	
25	Receiver	Hallicrafters	SX-100	fair	150	KGVO	
26	Receiver	Hallicrafters	SX28	very good	900	K0SN	
27	Receiver	Hallicrafters	SX-62B	untested, rough	75	KGVO	no cabinet top
28	Vintage Speaker	Hallicrafters	PM 23	Nice, untested	150	KGVO	
29	Vintage Speaker	Hammarlund	S-100	Nice, untested	60	KGVO	
30	AC Power Supply	Heath Kit	HP-23-A	works		KGVO	for the HW-101
31	SSB Transceiver	Heath Kit	HW-101	needs repair		KGVO	Ebay $90-300
32	HF Xcvr + Power Supply	Heathkit		untested	150	KGVO	
33	Oscilloscope	Heathkit	IO-4105	untested	30	KGVO	
34	Power/SWR Meter	Heathkit	HM15	untested		KGVO	
35	Vertical antenna		Dipole 80	?		NOAA	
36	Receiver	Heathkit	HR-10	untested, rough	offer	KGVO	Ebay sales $100-300
37	SSB Adapter	Heathkit		untested	40	KGVO	
38	Transceiver	Heathkit	SB102	good	250	KGVO	W/ matching spkr. & p.s.
39	Test Oscillator	HP	650A	untested	offer	KGVO	
40	Rotor Control	Hygain	DCU-1	untested	200	KGVO	
41	VHF Mobile Transceiver	Icom	IC-25A	fair, untested	30	KGVO	
42	Transceiver	Kenwood	TS-450S	Excellent	400	KGVO	
43	2M FM Transceiver	Kenwood	TR7400A	no output	10	KGVO	
44	HF Transceiver +Man	Kenwood	TS-520	non-working	100	KGVO	
45	Transceiver	Kenwood	TS-940	Needs Repair	250	KGVO	No output on CW, others
46	Transmitter	Meissner	9-1160 (tube)	good		KGVO	was in use
47	Voice Keyer	MFJ	MFJ-432	untested	30	KGVO	
48	Fwd/Refl. pwr meter	Midland	23-126	untested	10	KGVO	
49	2 mtr, 30 Watt amp	Mirage	B23	untested	25	KGVO	
50	20-40M QRP Transceiver	Oak Hills	QRP Classic	untested	30	KGVO	
51	13.8V, 10A P.S.	Pyramid	PS15-KX	Nice, untested	30	KGVO	
52	2 mtr mobile Xcvr	Radio Shack	HTX-242	untested	40	KGVO	
53	25A switching P.S.	Radio Shack		untested	40	KGVO	
54	Field str/SWR meter	Radio Shack		untested	10	KGVO	
55	VHF/UHF/FM amp	Radio Shack		untested	20	KGVO	
56	Gen. Coverage Rvr.	Realistic	DX302	untested	125	KGVO	Ebay sales $80-350

57	12V DC p.s.	Samlex		untested	25	KGVO	
58	Receiver	Signal Corps	R-392/URR	fair	300	KGVO	Stromberg Carlson
59	VTVM	Simpson	311	untested	25	KGVO	
60	Oscilloscope	Telequipment		untested	20	KGVO	
61	Var. power resistors	Tru-ohm, etc		untested	10	KGVO	box of ~20
62	Scanner	Uniden	BC9000	untested	50	KGVO	
63	BUG KEY	unknown		fair		KGVO	
64	12V DC Backup Power	West Mtn	PG40S	good, untested	25	KGVO	
65	Radio-Sound card interface	West Mtn	Riblaster Plus			KGVO	
66	HF Transceiver	Yaesu	FT-840	fair, works	300	KGVO	
67	Speaker	Yaesu	SP-8	Good, untested	125	KGVO	
68	VHF FM Transceiver	Yaesu	FT720RU	untested	25	KGVO	
69	VHF Transceiver	Yaesu	1500M	untested	75	KGVO	
70	Many electronic parts for amps, tuners, other projects, too numerous to list.				offer	KGVO	some free, door prizes
71	Misc. panel mount meters			untested,	40	KGVO	2 boxes full
72	Patch cords w/ RCA male			good	10	KGVO	box of ~20
73	Peter Dahl 10 HY @ 1 A		new	new		KGVO	
74	Peter Dahl 40 HY @ .6 A		new	new		KGVO	
75	Peter Dahl 9 HY @ 1.5A		NEW	NEW	200	KGVO	66 pounds - pick up only
76	Peter Dahl Swgng Choke		new	new		KGVO	
77	Antenna Tuner	Icom	AH-4			NZ7S	
78	Voice Synthesizer	Icom	UT-102			NZ7S	
79	Transceivers, qty.2	Kenwood	220-225 mhz.	?		NZ7S	
80	Antenna Tuner + man	MFJ	MFJ-934			NZ7S	
81	RTTY CW	MFJ		?		NZ7S	
82	Wattmeter/SWR	Coax. Dynam.	81021	com	200	KGVO	

Contact hfc@w7px.org for further information

40th Anniversary of Amateur Communication with Manned Spacecraft Features Local Ham - February QST

by K7VK Vick

In case you've missed it the February issue of QST has an article, ***Celebrating 40 Years of Amateur Radio on Human Spaceflight Missions*** by KA3HDO, page 54. The article highlights the first Amateur Radio contact with a manned spacecraft (1983). Local ham **W7GJ**, Lance Collister from Frenchtown Montana (Lance's call then was WA1JXN) achieved this contact with orbiting ham W5LFL, Owen Garriot (SK), in the Space Shuttle Columbia. Just reading the initial contact dialogue is thrilling and that contact opened a new era of hams being able to talk with astronauts and cosmonauts aboard orbiting spacecraft.

Thirty years later in 2013 Hellgate ARC members set up satellite radio equipment enabling Target Range school children to speak with an astronaut in the orbiting International Space Station.

Beginning to Build with Tubes

By Bryant Julstrom

Electronics hobbyists have always designed circuits and built devices. When electronics was in its infancy, this was out of necessity. As the technology has advanced and gotten smaller, we've continued to construct electronic devices. Among the technologies available to us are vacuum tubes, invented over 100 years ago and dominant until the rise of semiconductors. They're still interesting, rewarding, and worthy of investigation.

Why Build with Tubes?

There are a number of reasons to pursue tube-based projects. Vacuum tube technology is accessible; the principles on which tubes operate are straightforward. Tube circuits generally require a reasonable number of other parts.

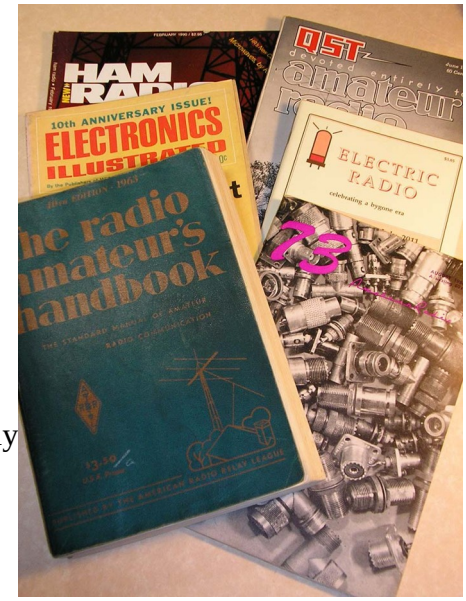
It's rewarding to operate devices whose functioning we completely understand and that we can maintain and repair.

Building with tubes reviews the history of the technology and promotes an understanding and appreciation of its development. If you are of a certain age, you can revisit projects you began many years ago. We can obtain interesting and useful functionality from tube circuits. Plus, tubes generate that pleasant orange glow.

Figure 1 shows three homebrew tube projects.

FIGURE 1. Three homebrew tube projects: a receiver back end (beat frequency oscillator, product detector, and audio output stage); a one-tube regenerative receiver; and a test oscillator.

Finding Information



The Internet has made it easy to find information about vacuum tube technology (and just about everything else; some of it is even accurate). Google and a grain of salt are your friends.

There are many websites — too many to list here — devoted to tube datasheets, principles, circuits, and projects. Electronics and amateur radio magazines from the ‘50s and ‘60s — *Popular Electronics*, *QST*, *CQ*, *73*, *Ham Radio*, and others — are extremely informative. Most of these are archived on-line or on CD; you don’t need to locate physical copies.

Similarly, you can download books from that period: RCA tube manuals, textbooks, and instruction manuals; *The Radio Amateur’s Handbook* (yearly editions); and many more. Currently, the magazine *Electric Radio* (**ermag.com**) presents tube-based radios and related projects (see **Figure 2**).

FIGURE 2. Some books and magazines from the 1960s that describe tube-based projects.

Getting Started

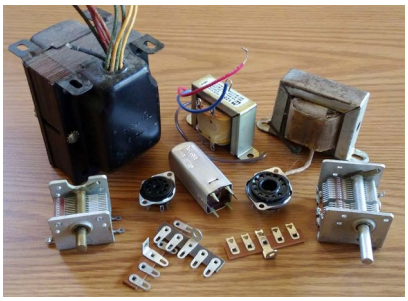
To begin, survey online sources and do some background reading; the more you know, the better. Start with small projects. Reproducing published examples provides experience, but don’t be afraid to experiment. In comparison to semiconductors, tubes are forgiving and can be (briefly) abused without ill effects.

Unless you’re reproducing a project from a magazine or book, it’s helpful to implement each circuit on a breadboard before constructing a permanent version. You want to be able to fiddle and adjust easily. There are more ways to breadboard tube circuits than can be presented here. Again, online searches will lead you to them.

Tube construction is generally chassis and panel as you would find in, say, a short-wave radio from 1965. So, permanent versions of projects generally require some metalwork. You can develop experience by building small modules that implement useful circuits like power supplies, audio amplifiers, and functional parts of receivers. A classic beginning project is a simple regenerative receiver.

You can also restore old hardware to useful function. For a good example, see the recent article in Issue-3 2020 by Bryan Bergeron in which he describes restoring a ‘60s-vintage AM/FM table radio.

Finding Parts and Materials



Tube circuits require many of the same parts as semiconductor projects: capacitors, resistors, connectors, and so on. The more difficult parts to find (and afford) are variable capacitors, filter chokes, and transformers. The latter include power transformers, intermediate frequency transformers, and audio interstage and output transformers. Hardware is mostly the same as for semiconductor projects, but tube sockets and terminal strips may be harder to find. **Figure 3** shows examples of these parts.

FIGURE 3. Parts for tube circuits that can be harder to find: variable capacitors, filter chokes, transformers, tube sockets, and terminal strips.

There are many sources — some more economical than others — for parts. Hamfests are flea markets for amateur radio operators and other electronics enthusiasts. They offer wide varieties of radios, tubes, other parts, and magazines and books (as well as interesting conversation) often at remarkably low prices. Due to COVID-19, no hamfests are happening as of this writing, but they should return soon. **Figure 4** was taken at a hamfest in 2019.

FIGURE 4. A table and the crowd at the the St. Cloud (MN) Amateur Radio Club hamfest.

Metal chassis are still available. We can repurpose salvaged chassis and enclosures, and we can build our own. For sheet stock, look through the drops (cut-offs) at a retail sheet metal supplier. Aluminum is your best bet.

Salvaging old hardware is not as productive as it once was, but you may run across an old TV, table radio, or "hi-fi." The most useful parts in these units — after all these years — are probably transformers and variable capacitors. (In the 1960s, Doug DeMaw W1FB described in *QST* a number of novice projects built entirely with parts extracted from dead TVs.) Don't disassemble any unit for parts with historical value.

In addition to the RadioShack aisle in HobbyTown, there are other retail outlets. In particular, look for commercial and industrial surplus stores which may have large and affordable stocks of tubes, transformers, and related parts.

Of course, the Internet provides many mail order outlets, some specialized and some more general like eBay and Amazon. Tube types favored by audiophiles and guitar players — for example, 12AX7, 6V6, and 6L6 — are generally expensive. Less well-known types will be much cheaper.

For example, Compactrons are 12-pin envelopes developed for TV applications. They contain up to four individual units that are often electronically identical to various miniature types. Compactrons are plentiful and inexpensive. In any case, there are many alternatives; tubes should be cheap.

Tools and Test Equipment

The tools required for tube-based projects are mostly the same as those for any electronic building. Hand tools include screwdrivers, soldering irons, pliers, diagonal cutters, files, and so on. Tube sockets mount in circular holes, so some way to cut them is necessary. Chassis punches are nice, but expensive; circle cutters and step bits are good options.

An electric drill with a good selection of bits is essential. If you can afford one, a drill press is better. Other larger metalworking tools might include a bending brake (a small one should be inexpensive) and, if possible, a metal shear for cutting sheet stock (much more expensive). You may have access to a shop in which metalwork can be carried out. Consider makerspaces which exist in many communities and schools.

Test equipment for building with tubes is the same as for building with semiconductors. The most important item is a multimeter, either analog or digital. Also useful are an adjustable metered power supply (high voltage in this case, and you should build it yourself) and audio-

and radio-frequency signal generators. An oscilloscope is useful but more expensive; consider a used one at a hamfest. Another option is a PC-based ‘scope front end, though these have lower maximum frequencies. **Figure 5** shows a typical selection of test equipment.

FIGURE 5. Test equipment for building with tubes. Clockwise from the top: oscilloscope, analog multimeter, power supply, digital multimeter, and RF signal generator.

Notes

Throughout the process of designing, debugging, and building projects, keep notes that describe what you’ve done, how it worked, what you changed, steps of construction, and so on. These notes are your record of each project. You may think you’ll remember everything you’ve done and why, but over a few weeks or months it can all become a mystery.

You have a free hand in how you maintain your notes. The two obvious options are on paper or in a computer file. In either case, record more detail than you think is necessary, include schematics and pictures, and update your notes regularly and often. (This requires discipline; ask me how I know.)

Keep track of the sources of information — book pages, magazine articles, web pages, and file names — and review your notes from time to time. They may remind you of unfinished projects or inspire new ideas. Throughout, remember that you’re writing for yourself and not an external audience, so neatness counts, but only as much as you want it to.

I keep my notes in hardbound sketchbooks. **Figure 6** shows a small project on the pages that describe it.

FIGURE 6. A tube project and the pages of notes that describe its development.

Caution – High Voltage

Remember that tubes require higher voltages than semiconductor circuits do, so be careful. Connect bleeder resistors across all power supply filter capacitors. Be aware of when a breadboard or device is on.

When a device is on, keep one hand in a pocket and allow no one else close to the work. Watch out for pets. Turn everything off when you step away.

A First Project

A good place to begin is a small power supply to provide some of that dangerous high voltage. At its heart will be a transformer with a 120V primary winding and two secondaries: 6.3V for tube filaments and a higher voltage from which to derive a tube’s B+. Depending on the secondary voltage and whether the secondary winding has a center tap, rectification may be half wave or full wave.

A useful extension to such a circuit is metering of both the output voltage and the current drawn from the supply. A further extension regulates the output voltage and allows it to be varied. **Figure 7** shows a supply with these features. I described this unit here a couple of years ago (Issue-5 2019). Many other examples appear in print and on-line.

FIGURE 7. A power supply for tube projects. It provides 6.3 VAC for filaments and adjustable, regulated, metered high voltage for B+.

A Few More Suggestions

To keep the process of building a project moving forward, accumulate or have access to the necessary parts and tools. Be reluctant to throw anything away — especially hardware. You may think you'll never need that triangle of aluminum with the right-angle bend and threaded 4-40 hole, until you do.

If possible, make your workspace larger than you think it needs to be; it will fill up soon enough. Keep small parts organized. It's frustrating to look through boxes and cans for a 150K 1/2W resistor that you know you have a bunch of.

As mentioned earlier, start with small projects and work up. Most important, have fun. NV

High Voltage Safety

The following 10 items of advice from veteran builder, Jim Garland W8ZR are adapted with permission from the newly-released 2018 edition of the ARRL Handbook and apply to any project involving high voltage — whether tube circuits or some other project.

We are all besieged these days with verbose safety warnings on mostly harmless consumer goods and have become accustomed to solid-state circuits in which we seldom encounter any AC voltage higher than 12V. It's easy to forget that some things really are dangerous, and high voltage is one of them.

1. Don't let your reach exceed your grasp. High voltage is not for beginners.
2. Working with high voltages requires the maturity and patience that comes with age and experience. If you are a young builder, work with an experienced mentor.
3. Never work around high voltage when you are tired, stressed, or in a hurry.
4. Never work around high voltage after drinking alcohol. Even one beer or glass of wine can impair your judgment and make you careless.

5.Before working on a high voltage power supply, always follow these three steps: Unplug the AC power cord; discharge any energy storage or filter capacitors; and verify that the voltage is truly zero. A time-honored practice is to use a “chicken stick” (a wooden dowel or PVC tube, with one end attached to a grounded wire) to make sure filter capacitors are completely discharged.

6.When working on a high voltage power supply, remember that a dangerous time is after the power supply has just been turned off, but before the filter capacitors have fully discharged. A 50 µF capacitor charged to 4,000V holds a potentially deadly 400 joules of energy. Even with bleeder resistors, it can take a minute or more to discharge fully.

7.When removing a recently discharged filter capacitor from a power supply, tie the two terminals together with wire. Large high voltage capacitors can self-charge to dangerous levels if the terminals are left floating.

8.Don’t stake your life on the expectation that bleeder resistors, fuses, circuit breakers, relays, and switches are always going to do their job. Even though modern components are very reliable, it is safe practice always to assume the worst.

9.Don’t build high voltage circuits if you don’t understand how the circuit works. High power amplifiers and power supplies are not “plug-and-play” projects with step-by-step instructions. Builders must be knowledgeable enough to improvise, make component substitutions, and implement design changes.

10.With high voltage projects, it doesn’t pay to be “penny wise and pound foolish.” Use high quality components throughout.

ARRL Book - Parks on the Air – HARC Library by K7VK

The ARRL book, ***Parks on the Air (POTA)*** is now in the Hellgate ARC library. It’s a good read for those interested in and wanting to learn more about this fun Amateur Radio program. It is also appropriate for those already involved in **POTA**.

POTA is a program of operating, ‘activating’ from designated Parks or contacting ‘chasing’ the hams activating the Parks. The 130-page book covers everything from getting started in the program, the equipment, operating to the fun **POTA** activities and awards.

This book is now in the hands of the Hellgate ARC secretary, K7MSO for checkout to those interested. Read it, return it to the club secretary or pass it to another interested member and let the secretary know who it went to. Please keep it circulating.

Then go out and ‘**Activate**’ a Park or ‘**Chase**’ a Park Activator. More information is on the web: https://pota.app/#/ and https://parksontheair.com

HELLGATE AMATEUR RADIO CLUB

AGENDA – 12 Feb 2024 meeting

Program: None

Meeting called to order at 7:__ PM (8 needed for business)
Introductions. Please make sure you signed the attendance sheet **Quorum Y/N ____**

Last meeting minutes, Jan: Motion to approve minutes: 1St _____2nd _____
Discussion _____ Vote: P/F/T

Treasurer's report: KJ7HYG, Discussion _____
_____Motion to approve report: 1St _____2nd _____ Vote: P/F/T

Repeater Committee Report: W7RPG, Discussion _____
_____Motion to approve report: 1St _____2nd _____ Vote: P/F/T

HF Committee Report: K0SN, Discussion _____
_____Motion to approve report: 1St _____2nd _____ Vote: P/F/T

Events for 2024:

Feb	02	Groundhog Day
Feb	12	HARC Testing and Meeting
Feb	14	Valentine's Day
Feb	19	Presidents Day
Mar	10	Daylight Savings Starts 2:00AM
Mar	11	HARC Testing and Meeting

VFW group will be doing the Lookout Pass Trail-Rail run again this year.

HARC Fun Net every Saturday morning @ 9:00 AM on 147.040 Repeater – Buy/Sell - During.

HARC Discussion List

1. _____
2. _____
3. _____

VHF Net Control Station assignments:

Feb	07	N7PAS	Mar	06	N7PAS
Feb	14	K7MSO	Mar	13	_____
Feb	21	K7MSO	Mar	20	_____
Feb	28	W7RPG	Mar	27	N7JGS
___	__	_____	___	__	_____

Reminder: Backup is always the next person in line as the net control.

Good and Welfare. _____

*** Next Club meeting: Mar 11 ***
Is there any other business? _____
_____ Meeting is Adjourned at _:__ PM.

Febuary 2024

Hellgate Amateur Radio Club

Calendar of Events

Board: NZ7S, W7RPG, KJ7THG, K7MSO

Editor - N7PAS

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2 Ground Hog Day	3 HARC Saturday Net 9:00AM on 147.040 Repeater.
4	5	6	7 ERC Net 7:30 on 146.900-88.5T BARC Net 8:15 on 146.720-203.5T HARC Net 9:00 on 147.040-No Tone	8	9	10 HARC Saturday Net 9:00AM on 147.040 Repeater.
11	12 HARC Testing 5:30 & Meeting 7:00PM Lincoln's Birthday	13	14 Valantine's Day ERC Net 7:30 on 146.900-88.5T BARC Net 8:15 on 146.720-203.5T HARC Net 9:00 on 147.040-No Tone	15	16	17 HARC Saturday Net 9:00AM on 147.040 Repeater.
18	19 President's Day	20	21 ERC Net 7:30 on 146.900-88.5T BARC Net 8:15 on 146.720-203.5T HARC Net 9:00 on 147.040-No Tone	22 Washington's Birthday	23	24 HARC Saturday Net 9:00AM on 147.040 Repeater.
25	26	27	28 ERC Net 7:30 on 146.900-88.5T BARC Net 8:15 on 146.720-203.5T HARC Net 9:00 on 147.040-No Tone	29 This year is a leap year where we have an extra day to catch up with our time clocks..		

HARC Events: (Actual Dates Unknown)

#	Month	Activity
1.	Monthly	MARS Interoperability Exercises – Eric NZ7S will keep us advised. 1st week of each month for 2024. Check in on 60 meters. Noon and 8 pm Channel
2.	April	Grizzly Triathlon
3.	April	Riverbank Run
4.	June	Trail Rail Run
5.	June	Field Day – What are we doing? -
6.	June	Missoula Marathon - was same day as field day in 2022
7.	July	W7PX Special 4th of July Event – Cabin needs to be reserved.
8	July	Glacier Waterton Hamfest
9.	Aug	Fox Hunts 1 per year on Saturday from 10:00AM to 4:00PM
10.	October	JOTA/JOTI
11.	October	Great Montana Shakeout Drill
12.	October	Bitterroot Mushers Dirt Dash
13.	November	Election Day
14.	December	Sky Warn Recognition Day (0000Z-2400Z)
15.	December	HARC Dinner Meeting

Home Brew HF Radio Carved by KR7Q **by K7VK**

KR7Q, is well known for his woodworking capabilities. His latest is a HF radio carving. He carved this amazing radio prototype using his CNC machine. He says this one required about 1.5 hours to complete.

The radio is a hot powerhouse. If the wood carving machine errors in carving the potential, watts are converted to BTUs in the wood stove, hee hee. This one is a keeper.

Fine work KR7Q!